samlexpower®

# DC-DC Step-Up Converter

VTC305-12-24

Owner's Manual

Please read this manual BEFORE installing your inverter

# OWNER'S MANUAL | Index


**SECTION 1**
Safety Instructions .....3

**SECTION 2**
Introduction & Layout .....3

**SECTION 3**
General Information ..... 5

**SECTION 4**
Installation ..... 8

**SECTION 5**
Protections, Monitoring & Troubleshooting ..... 10

**SECTION 6**
Specifications ..... 13

**SECTION 7**
Warranty ..... 14

# SECTION 1 | Important Safety Instructions

## 1.1 IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS. This manual contains important safety and operating instructions for the voltage converter.

1. Do not expose the voltage converter to rain or snow unless it is a sealed model.
2. Use of an attachment not recommended or sold by the manufacturer may result in a risk of fire, electric shock, or injury to persons.
3. Do not disassemble the voltage converter; return it to the manufacturer or an Authorized Service Center when service or repair is required. Incorrect reassembly may result in a risk of electric shock or fire. Voltages of up to 350 volts are present inside the voltage converter anytime it is connected to input power, even if it is switched off.
4. To reduce risk of electric shock, unplug the voltage converter from the DC power source before attempting any maintenance or cleaning. Turning off controls will not reduce this risk.
5. Never place the voltage converter directly above a battery; gases from battery will corrode and damage the voltage converter.
6. Never allow battery acid to drip on the voltage converter.

Samlex America does not recommend the use of VTC305-12-24 Voltage Converter in life support applications where failure or malfunction of this product can be reasonably expected to cause failure of the life support device or to significantly affect its safety or effectiveness. Samlex America does not recommend the use of any of its products in direct patient care. Examples of devices considered to be life support devices are neonatal oxygen analyzers, nerve stimulators (whether used for anesthesia, pain relief, or other purposes), auto-transfusion devices, blood pumps, defibrillators, arrhythmia detectors and alarms, pacemakers, hemodialysis systems, peritoneal dialysis systems, neonatal ventilator incubators, ventilators for both adults and infants, anesthesia ventilators, and infusion pumps as well as any other devices designated as “critical” by the U.S. FDA.

# SECTION 2 | Introduction & Layout

## 2.1 INTRODUCTION

This unit is a non-isolated DC-DC Step Up Converter used to boost unregulated voltage of 12V battery (Voltage range of 10.5 to 14.0 VDC) to regulated, programmable voltage of 24 to 27.5VDC (programmed in steps of 0.5V through DIP Switches. Default setting is 24.0VDC). DC to DC boosting is carried out using inductor based switching circuits and Pulse Width Modulation (PWM) control. The input and output sections are NOT isolated – the Negative is common between the input and the output sections.

The following protections / LED and Buzzer monitoring are provided (Refer to Section 5 for details).

- Reverse polarity on the input side
- Input / Output over voltage
- Short circuit / overload on the output side
- Low output voltage
- Low input voltage
- Over temperature

An SPDT (Single Pole Double Throw) relay has been used for providing contact switching for remote signalling of low output voltage condition (through DB-9 Connector).

An optional Remote Monitoring Panel RCP1-VTL is available for remote monitoring and On/Off control (connected through DB-9 connector).

## 2.2 MAIN PARTS


**Fig 2.1 Left Side of Chassis**

1. Output Connections ; Screws 6 x 32
2. 9-Pin, Female DB-9 Connector for remote monitoring and ON/OFF control.
3. ON/OFF Rocker Switch

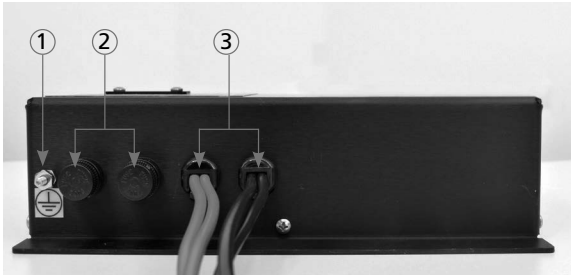



**Fig 2.2 Right Side of Chassis**

1. Ground Stud
2. Input Fuses:
   2 x 20A (Total 40A)
   Specs of each:
   - 32V, 20A, Fast Blow
   - ¼" x 1¼"
   - Type AGC
3. DC Input Wires: 2x Positive (AWG#10, 105°C) and 2x Negative (AWG#10, 105°C)

# SECTION 2 | Introduction & Layout

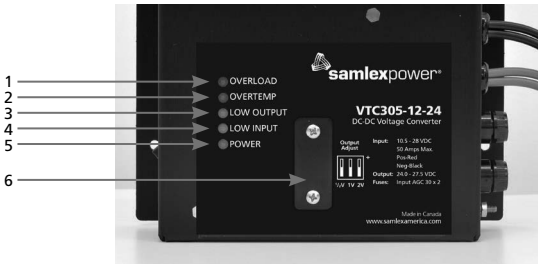



**Fig 2.3 Top of Chassis**

1. Red LED "OVERLOAD"
2. Red LED "OVERTEMP"
3. Yellow LED "LOW OUTPUT"
4. Yellow LED "LOW INPUT"
5. Green LED "POWER"
6. Set of 3 DIP Switches for adjusting output voltage (The DIP Switches are covered with a removable cover plate)

# SECTION 3 | General Information

## 3.1 OPERATION

To turn the unit ON, press the ON/OFF Rocker Switch (3, Fig 2.1) to ON position. The alarm buzzer will sound and the Yellow LED "LOW OUTPUT" (3, Fig 2.3), Yellow LED "LOW INPUT" (4, Fig 2.3) and Green LED "POWER" (5, Fig 2.3) will come on together briefly, and then the Green LED "POWER" (5, Fig 2.3) will continue to be ON. The unit will provide the programmed regulated voltage from no load to the maximum load shown in the specifications section. You may check this voltage at the output terminals of the unit with a good digital voltmeter.

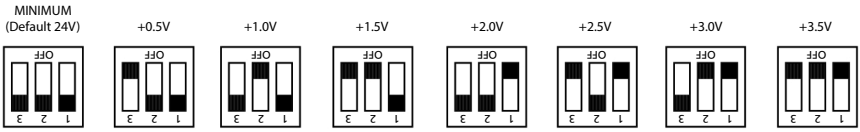
When the ON/OFF Rocker Switch (3, Fig 2.1) is switched OFF, the Green LED "POWER" (5, Fig 2.3) wil extinguish slowly in around 25 sec under no load condition.

## 3.2 OUTPUT VOLTAGE ADJUSTMENT

The default value of the output voltage is 24.0V.

A set of 3 DIP switches has been provided to adjust the output voltage in steps of 0.5V from the default voltage of 24.0V (see Fig 3.1 below). These DIP switches are located in a pocket covered by a removable cover plate (6, Fig 2.3).

To adjust the output voltage, turn off the ON/OFF Rocker Switch (3, Fig 2.1). Remove the plate covering the DIP Switches for output voltage adjustment (6, Fig 2.3). Reach in with a non-conductive device such as a pencil and position the DIP Switches as shown in Fig 3.1 below to select the desired output voltage. Replace the plate. Press the ON/OFF Rocker Switch (3, Fig 2.1) to ON position.




NOTE: Black portion indicates position of pushed down end of the toggle.

**Fig 3.1 DIP Switches for output voltage adjustment**

## 3.3 OUTPUT CURRENT

The output current capacity will depend upon the ratio of the input voltage and the programmed output voltage as per formula given below:

Output Current = (Input Voltage ÷ Programmed Output Voltage) x 27A

For example:

- At default output voltage of 24 VDC and input voltage of 12 VDC, the output current will be = (12V ÷ 24V) x 27A = 13.5A
- At default output voltage of 24 VDC and low input voltage of say 10.5 VDC, the output current will be = (10.5V ÷ 24V) x 27A = 11.8A
- At the highest programmed voltage of 27.5 VDC and low input voltage of say 10.5 VDC, the output current will be = (10.5V ÷ 27.5V) x 27A = 10.3A

## 3.4 LOAD SHARE OPTION (D OPTION)

Two or more units may be configured for load sharing if they are equipped with the optional output Isolation Diodes (see Fig 3.2 showing 2, "Option D" units connected in parallel). Connect a one foot piece of red wire of the appropriate gauge from each Positive output terminal to a common connection point to further assist in even load sharing. Set each voltage converter for the same output voltage.

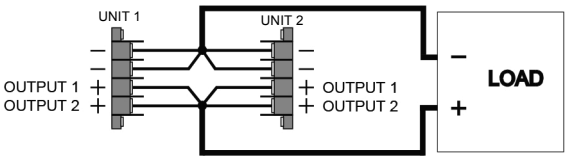



**Fig 3.2 Connecting 2 Units ("Option D" units) in Parallel for Load Sharing**

## 3.5 SPDT RELAY FOR REMOTE MONITORING

A Single Pole Double Throw (SPDT) Relay "K1" has been provided that will energize when Yellow LED "LOW OUTPUT" (3, Fig 2.3) and Buzzer alarms are switched ON due the output voltage dropping below 90% of the programmed value [Refer to Table 5.1-LED and Buzzer Alerts for Monitoring and Troubleshooting]. The contacts of the Relay are connected to Pins 1 and 6 of the Female DB-9 Connector (Fig 3.4).

A 3-Pin Connector marked "J11" with 2-Pin Shorting Link [Fig 3.3(a) / 3.3(b)] has been provided on the Component Side of the PCB to select one of the following 2 conditions of contact switching of Relay "K1" ("J11" can be accessed by removing the bottom cover of the unit):

- **Normally Open (NO) Condition [Fig 3.3(b)]:** The Shorting Link is placed between the lower 2 pins of J11. This is the default condition. The 2 output contacts 1 and 6 of the DB-9 Connector (Fig 3.4) will be open when the relay is de-energized and close when the relay is energized

- **Normally Closed (NC) Condition [Fig 3.3(a)]:** The Shorting Link is placed between the upper 2 pins of J11. In this condition, the 2 output contacts 1 and 6 of the DB-9 Connector (Fig 3.4) will be closed when the relay is de-energized and open when the relay is energized.

**NOTE:**
If remote monitoring in your unit activates an alarm condition when the unit is operating normally, the Shorting Link has been erroneously placed in "NC" position [Fig 3.3(a)]. Change the position of the Shorting Link on Connector J11 to its default "NO" position [Fig 3.3(b)] as follows:

1. Disconnect the DC input power to the unit
2. Turn the Power ON/OFF Switch (3, Fig 2.1) to ON position to discharge the internal storage capacitors
3. Turn the unit over and remove the 6 screws holding the bottom cover plate
4. Move the Shorting Link from the upper 2 pin shorting position [Fig 3.3(a)] to the lower 2 pin shorting position [Fig 3.3(b)]
5. Re-assemble the unit
6. Make sure that the Power ON/Off Switch (3, Fig 2.1) is OFF and then reconnect the DC input power
7. Turn the Power ON/Off Switch (3, Fig 2.1) to ON position and confirm that contacts 1 and 6 of DB-9 Connector (Fig 3.4) are open

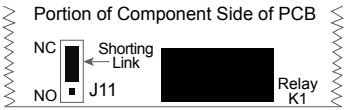



**Fig 3.3(a) Jumper J11 on the PCB in "NC" position**


**Fig 3.3(b) Jumper J11 on the PCB in "NO" condition (Default)**

## 3.6 DB-9 CONNECTOR

A Female DB-9, 9-Pin Connector (Fig 3.4) has been provided for remote monitoring and ON/OFF control. This is located on the left side of the unit (2, Fig 2.1). Pinout (Function of each pin) is shown in Fig 3.5.

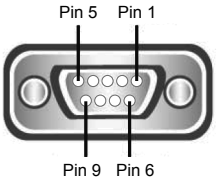



**Fig 3.4 Female DB-9 Connector for Remote Monitoring and On/Off Control**

# SECTION 3 | General Information

## 3.7 REMOTE CONTROL

An optional Remote Control Panel Model RCPI-VTL (Fig 3.6) may be connected to the voltage converter using the 9-pin, Female DB9 Connector (Fig 3.4) located on the left side of the voltage converter (2, Fig 2.1). The remote control panel allows the unit to be operated remotely as well as duplicating all the diagnostic indicators and audible alarm.

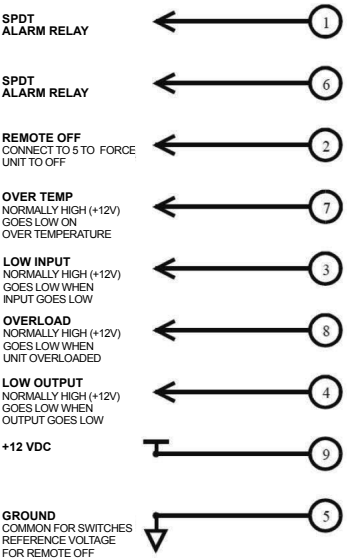



**Fig 3.5 Female DB-9 Connector-Pinout**


**Fig 3.6 Optional Remote Control Panel RCP1-VTL**

# SECTION 4 | Installation

## 4.1 MOUNTING

Mount the unit to allow at least 1 inch of clearance around the heat sink fins for adequate cooling.

Dimension are given at Fig 4.1.

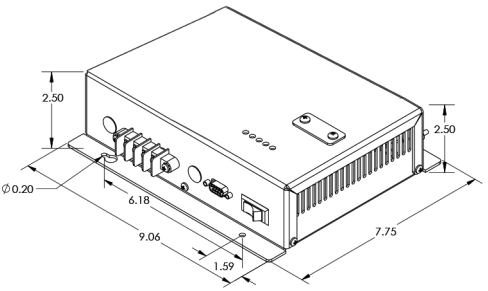



**Fig 4.1 Dimensions**

## 4.2 INPUT CONNECTIONS AND INPUT FUSING

The Ampacity of DC input wiring and Amp rating of fuses are based on NEC requirement of 1.25 times the rated DC input current of 30A. The unit comes with replaceable fuses with 40A net capacity (2 x 20A, AGC fuses in parallel – See 2, Fig 2.2).

The unit is provided with attached, 4ft. DC input wiring (3, Fig 2.2). Each of the Positive and Negative input wire connection consist of 2 x AWG#10 wires in parallel providing net wire size of AWG #7 which meets Ampacity requirement of 40A and also limits voltage drop to < 2% for 12V nominal input at 30A over 4 ft. If the input wiring is required to be extended, the Ampacity of the extension patch should be minimum 40A.

The internal 2 x 20A fuses (2, Fig 2.2) provide protection against over current occurring between the fuses and the input section of the unit. These fuses will not provide protection against short circuit along the length of wiring between the battery and these fuses. A battery is an unlimited source of current. If there is a short circuit along the DC input wiring, the short circuited section of wiring between the battery and the point of short circuit will be fed with hundreds of Amperes of current and this section will overheat, wiring conductors and insulation will melt and may cause fire. Hence, all battery wiring connected to various DC loads should be protected by appropriately sized in-line fuse placed as close as possible from the Positive Terminal of the battery, preferably within 7". Consider using 40A, Marine Rated Battery Fuse (MRBF) made by Cooper Bussmann. This type of fuse is installed right on top of the battery stud and hence, provides a very convenient short circuit protection for the battery wiring run. If this fuse is not available, install another suitable fuse within 7" of the battery Positive stud.

## 4.3 OUTPUT CONNECTIONS

Two Positive output terminals and two Negative output terminals are provided (See 1, Fig 2.1 and Fig 4.3). Connect only one wire to each terminal. Ensure that the total average load connected does not exceed the continuous current rating of the unit.

Each output terminal is rated for 25 Amps, so do not connect more than 25 Amps of load on either output terminal. If the load exceeds 25 Amps but is less than the continuous rated output of the unit, the output terminals must be connected to the load in parallel ensuring that the wiring used has sufficient capacity to handle the current (see Fig 4.3).

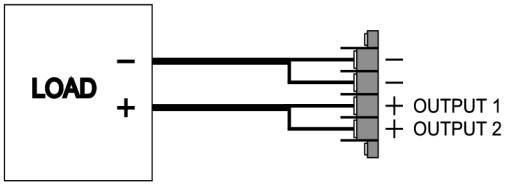



**Fig 4.3 Output connection for output current > 25A**

# SECTION 5 | Protections, Monitoring & Troubleshooting

## 5.1 PROTECTIONS RESULTING IN COMPLETE SHUTDOWN

The following protections will completely shut down the unit:

**Reverse polarity on the input side:**

- 2x20A input side fuses will blow
- Green LED "POWER" will be OFF

**Output over voltage of 130% of the programmed output voltage**

- 2x20A input side fuses will blow due to triggering of Crow Bar Circuit
- Green LED "POWER" will be OFF

**Input over voltage = (130% of programmed output voltage + 0.5V):**

- Output voltage will be = (Input voltage – 0.5V drop across series connected Schottky Diode) i.e. = 130% of the programmed output voltage. This will trigger output over voltage crow bar circuit
- 2x20A input side fuses will blow
- Green LED "POWER" will be OFF

**NOTE:** If the input voltage is more than programmed output voltage but less than (130% of programmed voltage +0.5V), the unit will continue to operate with output voltage = (Input voltage – 0.5V drop across series connected Schottky Diode)

**Short circuit / overload on the output side resulting in input current of > 40A**

- 2x20A input side fuses will blow
- Green LED "POWER" will be OFF

## 5.2 PROTECTIONS RESULTING IN ACTIVATION OF VISUAL AND AUDIBLE ALARMS

Table 5.1 below provides details of protections that will alert the user through visual LEDs / audible buzzer alarms.

**TABLE 5.1 LED AND BUZZER ALERTS FOR MONITORING AND TROUBLESHOOTING**

| Status of LED and Buzzer | Description of Status and Possible Reasons |
|---|---|
| **Green LED "Power" is ON** | Output voltage is available.<br>**NOTE:** This LED is connected across the output terminals and will be ON even during abnormal conditions of "Low Input", "Low Output", "Overload" and "Overtemp" because under these conditions, voltage boosting will be interrupted resulting in dropping of output voltage below the programmed voltage to value = (Input voltage – 0.5V drop across the series connected Schottky Diode). |

**TABLE 5.1 LED AND BUZZER ALERTS FOR MONITORING AND TROUBLESHOOTING (Continued)**

| Status of LED and Buzzer | Description of Status and Possible Reasons |
|---|---|
| **Red LED "Overload" is ON**<br>• **Buzzer is ON** | Overload on the output side because the load current is > [27A x (Input Voltage ÷ the Programmed Output Voltage)]<br>• Voltage boosting has stopped resulting in dropping of output voltage below the programmed voltage to a value = (Input voltage – 0.5V drop across the series connected Schottky Diode).<br>• When the output voltage drops to < 90% of the programmed output voltage, **Yellow LED "Low Output" will also be ON**<br>• **NOTE:** Green LED "Power" will be ON |
| **Yellow LED "Low Output" is ON**<br>• **Buzzer is ON** | Output voltage has dropped to < 90% of the programmed output voltage due to one or more of the following conditions:<br>• **Red LED "Overload" is ON:** There is overload condition on the output side because the load current is > [27A x (Input Voltage ÷ the programmed Output Voltage)]. Voltage boosting has been stopped resulting in dropping of output voltage to value = (Input voltage – 0.5V drop across the series connected Schottky Diode).<br>• **Yellow LED "Low Input" is ON:** The input voltage has dropped to < 10 ± 0.2V and hence, boosting of input voltage has been stopped resulting in dropping of output voltage to value = (Input voltage – 0.5V drop across the series connected Schottky Diode).<br>• **Red LED "Overtemp" is ON:** Temperature of hot spot inside the unit is 84°C or higher. Voltage boosting has been stopped resulting in dropping of output voltage to value = (Input voltage – 0.5V drop across the series connected Schottky Diode).<br>**NOTE:** Green LED "Power" will be ON |
| **Yellow LED "LOW INPUT" is ON**<br>• **Buzzer is ON** | The input voltage has dropped to < 10 ± 0.2V.<br>• Voltage boosting has been stopped resulting in dropping of output voltage to value = (Input voltage – 0.5V drop across the series connected Schottky Diode).<br>• As the output voltage has dropped to < 10 ± 0.2V which is < 90% of the programmed output voltage, **Yellow LED "LOW OUTPUT" will also be ON**<br>**NOTE:** Green LED "POWER" will be ON |

**TABLE 5.1 LED AND BUZZER ALERTS FOR MONITORING AND TROUBLESHOOTING (Continued)**

| Status of LED and Buzzer | Description of Status and Possible Reasons |
|---|---|
| **Red LED "OVER-TEMP" is ON**<br>**• Buzzer is ON** | Temperature of hot spot inside the unit is 84°C or higher.<br>• Boosting of input voltage has been stopped resulting in dropping of output voltage to value = (Input voltage – 0.5V drop across the series connected Schottky Diode).<br>• As the output voltage has dropped to a value = (Input voltage – 0.5V drop across the series connected Schottky Diode) and this value is < 90% of the programmed output voltage, **Yellow LED "Low Output" will also ON**<br>• **The unit will reset automatically when the temperature of the hot spot drops to 80°C**<br>**NOTE:** Green LED "Power" will be ON |
| **Green LED "Power" is OFF** | There is no output voltage<br>• ON/OFF Rocker Switch has been turned OFF<br>• External DC input fuse for protecting the battery cables or the 2x20A DC input fuses in the unit (2, Fig 2,2) have blown due to (i) input over voltage (see Section 5.1), (ii) output over voltage (see Section 5.1), (iii) reverse polarity on the input side (see Section 5.1) or, (iv) short circuit or overload on the output side resulting in input current of >40A (see Section 5.1) |

# SECTION 6 | Specifications

| MODEL NO. | VTC305-12-24 |
|---|---|
| **INPUT** | |
| INPUT VOLTAGE RANGE | 10.5 – 28 VDC |
| INPUT CURRENT | 30A Maximum |
| NOISE ON INPUT | < 50mV |
| INPUT CONNECTION | 4 ft., 2 x AWG #10 wires in parallel for each input. Bare ends |
| INPUT FUSING | 2 x 20A, 32V Fuses in parallel (Total 40A). Specs of each Fuse: (i) Type "AGC" (ii) 32V, 20A; Fast Blow (iii) Size: ¼" x 1-¼" |
| **OUTPUT** | |
| OUTPUT VOLTAGE | 24 VDC (Default). Programmable to up to 27.5 VDC in 0.5 VDC steps using DIP Switches |
| OUTPUT CURRENT LIMIT | 27A x (Input Voltage ÷ Set Output Voltage) ; e.g. 13.5A at 12 VDC Input and 24 VDC Output (See Note 1) |
| OUTPUT RIPPLE AND NOISE | 100mV Peak to Peak |
| TRANSIENT RESPONSE | <1V for 50% Step Load |
| LINE AND LOAD REGULATION | < ± 0.5% |
| EFFICIENCY | >90% at maximum output |
| ISOLATION | • Input to Output: No isolation (Common Negative)<br>• Input to chassis and output to chassis: 500 VDC |
| REMOTE ON/OFF CONTROL AND MONITORING | • Through 9 Position D-Sub Connector:<br>• Optional Remote Control Panel RCP1-VTL : Provides remote On/Off control and duplicates all diagnostic LEDs and audible alarms provided in the VTC<br>• Selectable NO (Default) / NC relay operated contacts to signal "OUTPUT LOW" Alarm condition |
| AUDIBLE NOISE | None. Unit is convection cooled |
| OUTPUT CONNECTIONS | 4 position Terminal Block; 6x32 Screws |
| **COOLING** | |
| TYPE OF COOLING | Convection cooled – no fan |
| **PROTECTIONS RESULTING IN VISUAL AND AUDIBLE ALARMS** | |
| OVERLOAD | Red LED "OVERLOAD" – Load current exceeds the value of Output Current Limit. Auto reset when output current drops below the Current Limit |
| LOW INPUT | Yellow LED "LOW INPUT" and Buzzer. Input voltage is < 10.0 ± 0.2 VDC. Auto reset at 10.5 ± 0.2 VDC |
| LOW OUTPUT | Yellow LED "LOW OUTPUT" and Buzzer. Output voltage drops to 90% of the set output voltage. Auto reset |
| OVER TEMPERATURE | Red LED "OVERTEMP" and Buzzer. Hot spot inside the unit is 84°C or above. Output voltage will drop. Will reset when the hot spot cools down to 80°C |
| **PROTECTIONS RESULTING IN COMPLETE SHUTDOWN** | |
| INPUT OVER VOLTAGE SHUTDOWN | 2x20A input side fuses will blow if the input voltage rises to (130% of the programmed output voltage + 0.5V) |
| OUTPUT OVER VOLTAGE SHUTDOWN | 2x20A input side fuses will blow if the output voltage rises to 130% of the programmed output voltage |
| OUTPUT OVERLOAD / SHORT CIRCUIT SHUTDOWN | 2x20A input side fuses will blow if input side current exceeds 40A due to short circuit / overload on the output side |
| REVERSE POLARITY ON INPUT SIDE | 2x20A input side fuses will blow |
| **ENVIRONMENTAL** | |
| OPERATING TEMPERATURE RANGE | -25°C to +40°C@ maximum output. Derate linearly 2.5% per °C from 40°C (Optional version with -40°C to +55°C range is available) |
| HUMIDITY | 0-95% Relative Humidity (non-condensing) with standard conformal coating |
| **SAFETY AND EMISSIONS** | |
| SAFETY | Meets CSA 22.2 No.107.1 and UL458 |
| EMISSIONS | Meets FCC Part 15(B), Class B |
| **MECHANICAL AND OTHER** | |
| MOUNTING | Wall or shelf mount |
| CLEARANCE | 25mm / 1.0 in all around |
| CHASSIS MATERIAL AND FINISH | Marine Grade black anodized Aluminum with 18-8 Stainless Steel fasteners |
| DIMENSIONS (W x D x H) | 231x198x64mm / 9.1x7.8x2.5 in |
| WEIGHT | 4.0 lb / 1.8kg |

**NOTES:**

1. Value of Output Current Limit depends upon the ratio of the Input Voltage and the programmed Output Voltage as per formula: "Output Current Limit in Amps = 27 x (Input Voltage ÷ Programmed Output Voltage)". For example, at Input Voltage of 12V and the default Output Voltage of 24V, the Output Current Limit will be 27 x (12V ÷ 24V) = 13.5A. If the load current rating is > the value of Current Limit, the output voltage will drop below the programmed value.
2. All specifications given above are at ambient temperature of 25°C / 77°F
3. Specifications are subject to change without notice

# SECTION 7 | Warranty

## 2 YEAR LIMITED WARRANTY

VTC305-12-24 is manufactured by Samlex America, Inc. (the "Warrantor") is warranted to be free from defects in workmanship and materials under normal use and service. The warranty period is 2 years for the United States and Canada, and is in effect from the date of purchase by the user (the "Purchaser").

Warranty outside of the United States and Canada is limited to 6 months. For a warranty claim, the Purchaser should contact the place of purchase to obtain a Return Authorization Number.

The defective part or unit should be returned at the Purchaser's expense to the authorized location. A written statement describing the nature of the defect, the date of purchase, the place of purchase, and the Purchaser's name, address and telephone number should also be included.

If upon the Warrantor's examination, the defect proves to be the result of defective material or workmanship, the equipment will be repaired or replaced at the Warrantor's option without charge, and returned to the Purchaser at the Warrantor's expense. (Contiguous US and Canada only)

No refund of the purchase price will be granted to the Purchaser, unless the Warrantor is unable to remedy the defect after having a reasonable number of opportunities to do so. Warranty service shall be performed only by the Warrantor. Any attempt to remedy the defect by anyone other than the Warrantor shall render this warranty void. There shall be no warranty for defects or damages caused by faulty installation or hook-up, abuse or misuse of the equipment including exposure to excessive heat, salt or fresh water spray, or water immersion.

No other express warranty is hereby given and there are no warranties which extend beyond those described herein. This warranty is expressly in lieu of any other expressed or implied warranties, including any implied warranty of merchantability, fitness for the ordinary purposes for which such goods are used, or fitness for a particular purpose, or any other obligations on the part of the Warrantor or its employees and representatives.

There shall be no responsibility or liability whatsoever on the part of the Warrantor or its employees and representatives for injury to any persons, or damage to person or persons, or damage to property, or loss of income or profit, or any other consequential or resulting damage which may be claimed to have been incurred through the use or sale of the equipment, including any possible failure of malfunction of the equipment, or part thereof. The Warrantor assumes no liability for incidental or consequential damages of any kind.

**Samlex America Inc. (the "Warrantor")**
**www.samlexamerica.com**

## NOTES:

# Contact Information


Toll Free Numbers
Ph: 1 800 561 5885
Fax: 1 888 814 5210

Local Numbers
Ph: 604 525 3836
Fax: 604 525 5221

Website
www.samlexamerica.com

USA Shipping Warehouses
Kent, WA
Plymouth, MI

Canadian Shipping Warehouse
Delta, BC

Email purchase orders to
orders@samlexamerica.com


samlexamerica®

11015-VTC305-12-24-0717